

# Richmond Refinery LPS Bulletin – Reliability

## Pipe Coating Failure at High Temperature



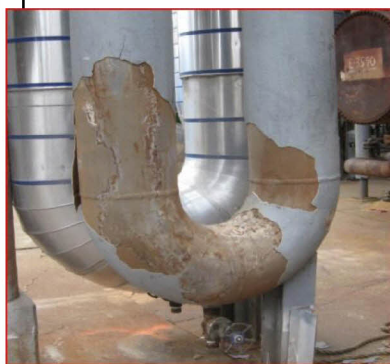
IMPACT ERM ID: 9478

**Location:**  
**Distillation & Reforming West**

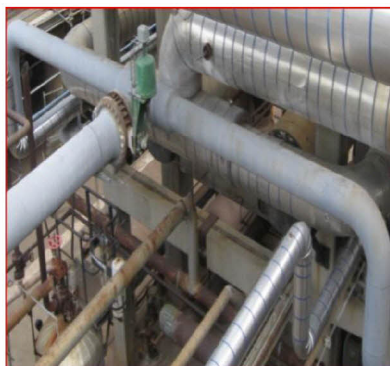
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**Reference Photos:**



Coating Insulation Flaking off of Pipe



Coating Insulation remains intact .

**Tenets of Operations Violated:**

- 4) Follow safe work practices and procedures
- 6) Always maintain integrity of dedicated systems.

***Every Task, The Right Way,  
Every Time!***

**Incident Description:**

Delta Industrial Thermal Insulating Coating (by MASCOAT) was applied on process piping in lieu of 2" standard Calcium-Silicate insulation material. Spikes in operating temperature during regeneration resulted in the coating failure.

**Investigation Findings:**

1. New insulation material (Delta Industrial Thermal Insulating Coating) was added to the pipe in May 2009 and it flaked off (failed) in Feb 2011 when higher temperatures exceeded the manufacturer's recommended 400°F temperature limits for two weeks during REGEN.
2. No MOC was initiated by Project Group nor ABU for the replacement of insulation not-in-kind (which was required by RI-370 Management of Change Process).
3. The Plant experiences higher than normal temperatures during plant shutdowns and start-ups (especially during regeneration phases).

**Lesson Learned**

1. Risk Analysis and Product limitations (e.g. the impact from potential significant temperature spikes) should be examined and understood prior to implementing new procedures or using new products other than the recommended products or procedures.
2. Process scenarios outside of normal operations should be clearly understood and analyzed when performing calculations and analysis of a new procedure or product and prior to implementing any such new recommended procedures or products.
3. Clear Process Safety Management guidelines at every level should be given and driven by the Refinery's Management of Change Process.

**What Worked Well:**

1. Progressive and Regulatory Refinery Wide Project (Effort) was followed to prevent Corrosion Under Insulation (CUI) issues.
2. There were no injuries or major incidents related to the failure of the new insulation material (Delta Industrial Thermal Insulating Coating).
3. Several employees and subject matter experts, and their progressive efforts, were involved in the Health, Safety and Environmental meeting held to evaluate the discovered failure of the new insulation material.

**Recommendations:**

1. Design & Engineering (Management of Change): Add step to the CUI Project Master Guidelines (procedure) for recommendations for pilot studies of new materials to ensure/require the initiation of the Management of Change Process (RI-370) prior to implementing any changes not-in-kind.
2. Design & Engineering (Chemical Selection and Substitution): Path forward for piping with failed Standard MT-DTI coating is to re-insulate such piping with the prior standard 2" Calcium-Silicate insulation.
3. Maintenance & Inspections (Inspections & Testing): Inspect all areas where coating (Standard MT-DTI) has been applied to determine if the coating has any flaking/failure. If flaking/failure have occurred determine if the cause was process related or mechanical damage. Work with impacted Area Business Unit to correct any flaking/failures.

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